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HARTCROWSER

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Earth and Environmental Technologies

J-2082

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DEC 11 1987
METRO

December 11, 1987

Municipality of Metropolitan Seattle
322 W. Ewing St.
Seattle, WA 98119

Attn: Mr. Bruce Burrows

Re: Conceptual Drainage and Process Water Treatment Plan
Lone Star Industries New Readymix and Dry Plant
Duwamish Facility

Gentlemen:

In response to your request for a report on a conceptual drainage plan for the Lone Star Industries, Inc. Duwamish facility, Hart Crowser, Inc. was retained by Lone Star to conduct a preliminary review of the existing stormwater drainage and process water treatment systems at the existing facility. Potential changes in process activities which may result from construction of a new readymix and dry plant on the property (tentatively scheduled for Spring, 1988) were also addressed. Conceptual-level plans for handling storm and process water at the proposed new facility have been developed, based on preliminary site topographic data. This letter presents a brief summary of pertinent stormwater and process water issues identified at both the existing and proposed facilities, and includes general recommendations for a future site drainage plan. More detailed descriptions of the existing and proposed stormwater facilities, including proposed grading activities, will be presented to METRO as soon as the site topography is established with more certainty.

Description of the Process

The principal water quality issue identified at the existing Lone Star facility is high pH and suspended solids levels in plant and equipment washdown water. The high pH is a particular concern, since existing state and federal regulations classify waters with a pH above 12.5 as either dangerous or hazardous waste (RCRA). pH levels above 12.5 have been measured in on-site plant wash water, primarily as a result of dissolution of alkaline materials present in Portland cement mixtures. No other dangerous or hazardous waste constituents have been identified at the facility.

Based on our review of the existing and proposed Lone Star facilities, the generation of high pH water is probably restricted to the truck rinse areas in the northern area of the property, the washout screw unit located in the southern region of the facility, and the existing batch plant located immediately northwest of the screw (see attached Horton Dennis plan). These three process areas are roughly equal in size, and total approximately 1/4 acre. If a new plant is constructed, a third wash area of approximately 0.1 acre would probably be added to the northern area, but the existing batch plant area would be eliminated, resulting in no net change to the total process area. Although cement is handled in other areas of the site, the potential for high pH aqueous releases resulting from such activities (e.g. spillage) is felt to be quite limited. Bagging activities are performed in a covered building; any product spillage is collected indoors. Due to the nature of cement, any product spilled onto the ground would generally solidify prior to becoming available for aqueous transport. The principal processes which generate high pH water are equipment and associated pavement rinsing, since these activities produce a relatively dilute product solution which is quite soluble in water.

Rinse waters are directed by a combination of lined channels and pipes to a sedimentation basin with approximately 150,000 gallons of storage capacity. After a period of settling, the water is then withdrawn and pumped into a 125,000 gallon clarification and storage tank which provides further solids removal. The contents of this tank are generally withdrawn daily into an in-line pH treatment system (by metered acid addition), with final discharge into the METRO collection system. The pH of this discharge typically ranges from 8 to 10; very few observations have exceeded 12.5 (based on 1987 discharge monitoring reports). No problems of solids discharges into the METRO system have been noted.

Dry season flows from the treatment facility typically average approximately 30,000 gallons per day (gpd; Figure 1), which is

below the existing METRO permit limitation of 48,000 gpd. Nearly all of this flow is attributable to washdown water. Flows have recently been reduced by reusing some of the clarified rinse waters in washdown activities (L. Compher, Lone Star, personal communication). Current plans call for greater reuse of the washdown water.

Lone Star presently uses approximately 20,000 to 30,000 gpd of water in concrete preparations. However, the use of clarified washdown waters (and associated storm waters; see below) in these preparations is limited by City of Seattle and Washington State regulations which restrict the use of non-potable quality water to non-structural concrete applications. Considerably greater recycling may be possible if the pH of the clarified water consistently fell within potable water limits (5.0 to 9.0).

In an effort to increase the reuse of plant washdown water (and possibly also storm water), Lone Star has ordered a new clarification/pH treatment unit for its Duwamish facility. If the system performs to the manufacturer's specifications, much of the washdown water produced on-site could be used in concrete preparations. In combination with a program of washdown water reuse, the quantity of process waters discharged to METRO could be greatly reduced. It should be noted, however, that such a reduction in discharge is dependent upon the success of the new treatment system. Preliminary performance data on the new system should be available by early summer, 1988.

Stormwater Runoff

Although the existing process water generation areas are relatively small (ca. 1/4 acre total), the drainage area contributing to the treatment system totals approximately 2.0 acres. The drainage area is depicted on the attached site plan (Horton Dennis, Dec. 9, 1987), and includes a considerable portion of the total Lone Star property. Presently, only the northern truck rinse area is graded to separate this activity from adjacent areas. Approximately 3/4 to 1 acre of the drainage area tributary to the treatment system is impermeable asphalt or concrete.

The remaining site drainage is presently served by local collection and oil/water separation systems in the northeast region of the site with discharge into the METRO storm sewer, with ultimate discharge into Duwamish Slip No. 2. On-site stormwater runoff is also collected in local drains in the southwest region of the site which discharge to the Duwamish Waterway. However, based on available information, much of the site (esp. near the central property area) does not appear to drain into surface water collection systems, but rather forms local ponds which ultimately seep into permeable fill soils which underlie the site. Additional data would be required, however, to verify the infiltration hypothesis.

During large storm events, increased flows into the treatment system have been observed, and special arrangements for discharge during off-peak hours have occasionally been required to allow the release of excess flows into the METRO system (L. Compher, Lone Star, personal communication). However, the storm flows do not appear to present a chronic problem of high discharge rates during the wet season, since monthly average discharges are quite consistent from month to month, and actually appear to peak during the dry season (based on 1987 data, Figure 1).

In an effort to determine the significance of storm flows into the treatment system, the available data on plant discharge were reviewed and correlated with local Sea-Tac airport precipitation records. Available daily records of Lone Star's discharge into the METRO system are limited to measurements from December, 1986 through November, 1987 (B. Tea, Lone Star, personal communication). Data were obtained by both volumetric calculations and with a magnetic/electronic digital flow meter; the accuracy of these data has not been evaluated.

The record of daily discharges into the METRO system during the first quarter of 1987 is presented in Figure 2. During this period, 24-hour precipitation events of up to 1.9 inches occurred. In order to provide a preliminary estimate of the relationship between precipitation and discharge from the treatment system, a daily estimate of potential storm runoff was calculated, assuming that 50 percent of precipitation onto the 2.0 acre drainage area is available for runoff. The 50 percent value was based on estimates of impervious area, since all precipitation falling onto these areas during storm events may produce runoff.

The observed relationship between precipitation and plant discharge is very poor (Figure 2). Only minor responses to rainfall are

evident in the data, and the nearly 2 inch storm did not produce any reported increase in plant flows, even though the predicted storm runoff quantity exceeded 70,000 gpd. The discrepancy in these data may be the result of several factors, including:

- All of the 2 acre drainage area (or 1 acre impervious area) may not be effective in producing runoff. Some of this potential runoff could infiltrate.

- Existing flow records could be faulty.

Without agreement between these data, the actual significance of storm runoff to the treatment system cannot be estimated. However, given the magnitude of the potential runoff calculations, and visual observations of increased flows during wet weather, it is reasonable to assume that runoff may occasionally become a significant factor contributing to plant flows.

Recommended Drainage Plan

Based on our review of available topographic information (which is itself preliminary) and the proposed plan of the new facility, we recommend that the following items be considered:

- Construct a trench grate immediately south of the existing solids screw to intercept approximately 1/4 acre of impervious area to the south. The principal activity in this area under the proposed facility plan is employee parking. An oil/water separator should be installed prior to discharge into the Duwamish Waterway. This facility would divert approximately half of the impervious area runoff from the treatment system, probably with a corresponding decrease in storm flows. A discharge permit from the Washington State Department of Ecology will be necessary.

- Grade the area surrounding the new batch plant at the proposed facility to separate this activity from adjacent areas. Collect washdown and storm water produced in this area (ca. 0.1 acre) and route this water to the treatment system.

- Continue to recycle process water through the clarification system and investigate additional methods of water reuse.

We hope this letter has provided you with sufficient information to evaluate Lone Star's options for on-site drainage and reductions in discharges to METRO. We look forward to discussing this issue and presenting our more detailed drainage plans with you in the near future. Please do not hesitate to call should you have any questions.

Sincerely,

HART CROWSER, INC.

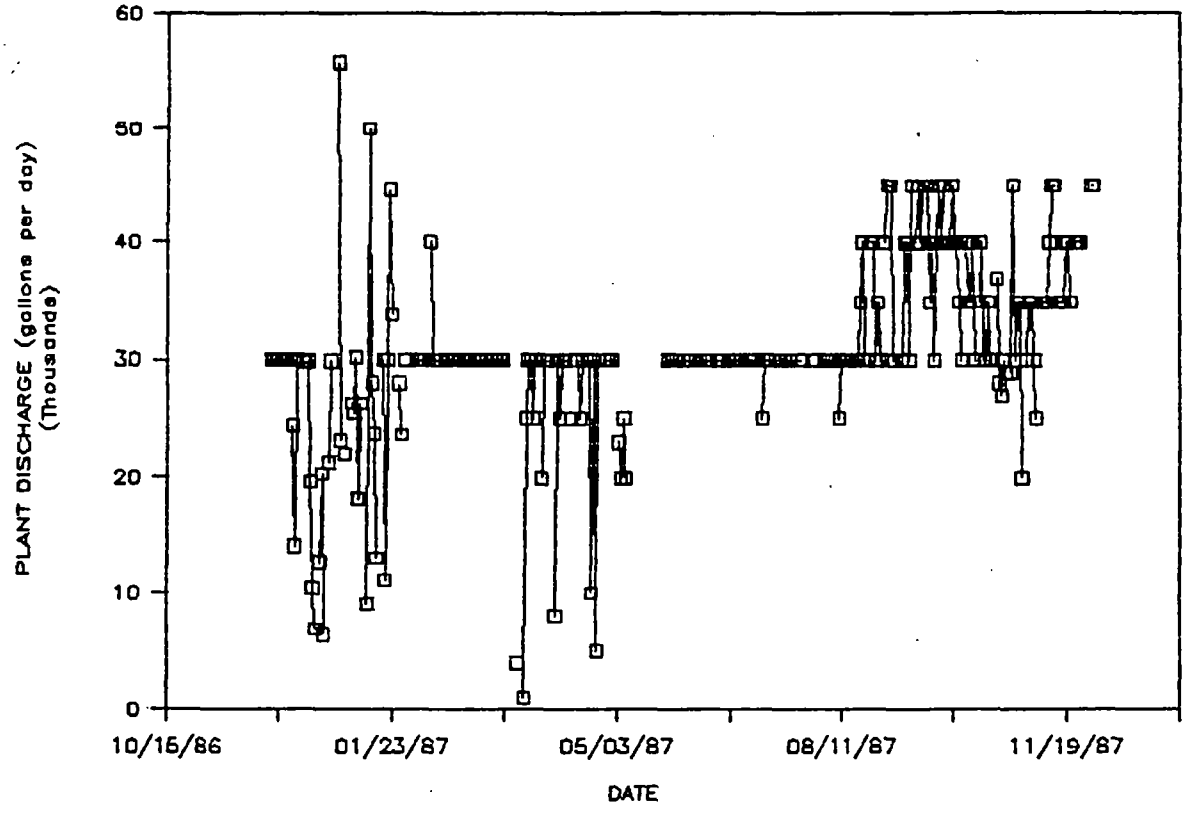
CLAYTON R. PATMONT
Senior Water Quality Specialist

CRP:sek
LONESTAR/JOBS

cc: Lone Star Industries, Inc., Attn: Leonard Compher
Eugene J. Dale, P.S., Inc., Attn: Bud Dale
Horton Dennis and Assoc., Inc., Attn: Zenan Zazuela

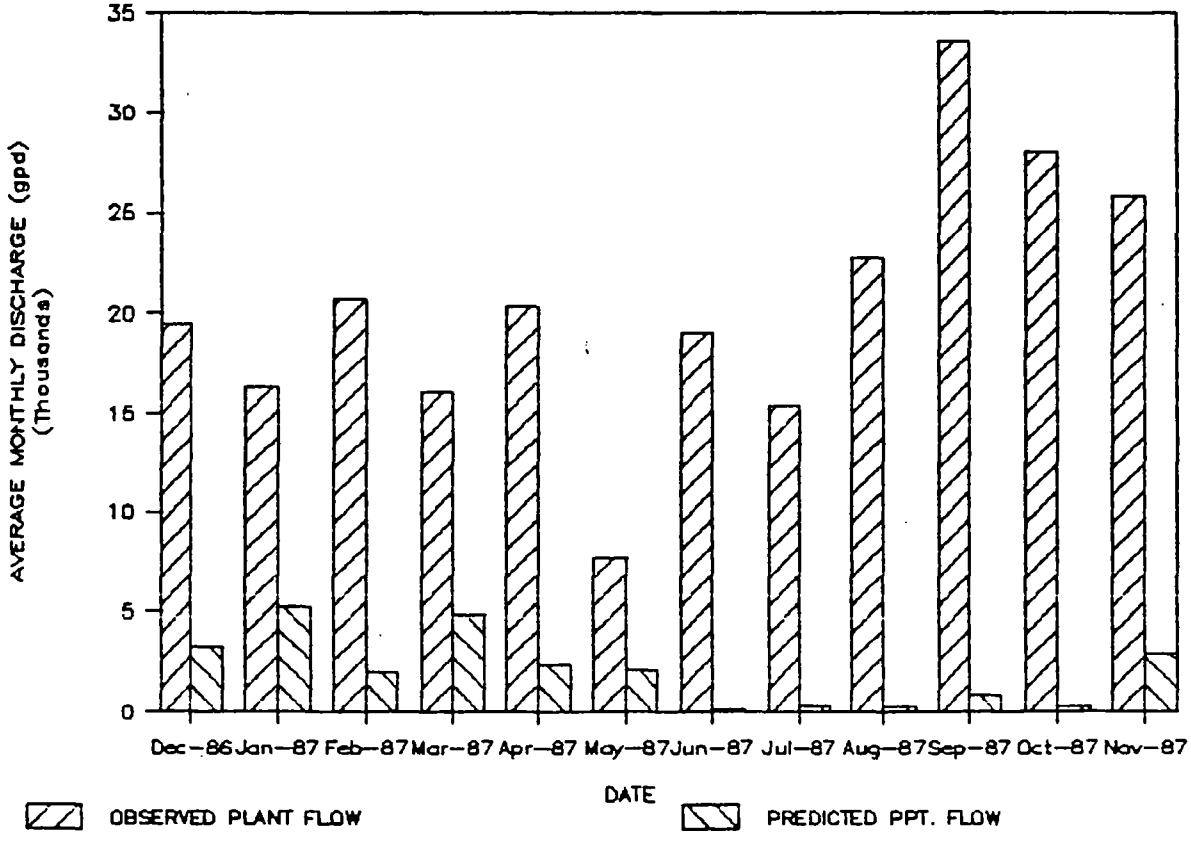
LONE STAR INDUSTRIES, DUWAMISH PLANT

DAILY DISCHARGE TO METRO SYSTEM



MONTHLY VARIATIONS IN AVERAGE DISCHARGE

LONE STAR INDUSTRIES, DUWAMISH



TOTAL DISCHARGE AND PRECIPITATION

First Quarter 1987